

What is claimed is:

1 1. A solid-state imaging element, comprising:
2 a plurality of light-receiving sensors converting optical signals to electrical
3 signals; and
4 a memory storing the electrical signals as optical image data, said memory being
5 formed of a plurality of line buffers.

1 2. The solid-state imaging element of claim 1, further comprising:
2 a first switch circuit connecting one of the line buffers and said light-receiving
3 sensors.

1 3. The solid-state imaging element of claim 2, wherein the data in the line
2 buffers are output in parallel.

1 4. The solid-state imaging element of claim 1, further comprising:
2 a second switch circuit selecting one of the line buffers to output the electrical
3 signal.

1 5. A solid-state imaging element, comprising:

1 a plurality of light receiving sensors arranged as m sensors in each of n lines
2 to convert optical signals to electrical signals; and
3 a memory storing the electrical signals as optical image data, said memory
4 being formed of a plurality of buffers, each buffer storing m data.

1 6. The solid-state imaging element of claim 5, further comprising:
2 a switch circuit connecting one of the buffers and said light-receiving sensors.

1 7. The solid-state imaging element of claim 6, further comprising:
2 a transfer control circuit selecting certain ones of said light-receiving sensors
3 to supply the electrical signal to the buffers.

1 8. An image processor, comprising:
2 a solid-state imaging element comprising a plurality of light receiving sensors
3 to convert optical signals to electrical signals;
4 an encoder encoding the electrical signals in units of $n \times m$ pixels; and
5 an electrical signal holder within said solid-state imaging element comprising
6 line buffers.

1 9. The image processor of claim 8, further comprising:
2 a first switch circuit connecting one of the line buffers and the light receiving sensors.

1 10. The image processor of claim 9, wherein data in the line buffers are output in
2 parallel.

1 11. The image processor of claim 8, further comprising:
2 a second switch circuit selecting one of the line buffers and outputting an
3 electrical signal thereto.

1 12. The image processor of claim 8, wherein said encoder is a JPEG encoder.

1 13. An image processor, comprising:
2 a solid-state imaging element having a plurality of light-receiving sensors to
3 convert optical signals into electrical signals;
4 a code encoder encoding the electrical signals in units of $n \times m$ pixels; and
5 an electrical signal holder within said solid-state imaging element comprising
6 a plurality of buffers, each buffer storing m data.

1 14. The image processor of claim 13, further comprising:
2 a switch circuit connecting one of the buffers and the light-receiving sensors.

1 15. The image processor of claim 13, further comprising:

1 a transfer control circuit selecting certain ones of the light-receiving sensors
2 to supply an electrical signal to the buffers.

1 16. The image processor of claim 13, wherein said code encoder is a JPEG
2 encoder.

1 17. An image processing method, comprising:
2 converting optical signals to electrical signals in a plurality of light-receiving
3 sensors;
4 outputting the electrical signals in units of $n \times m$ blocks of pixels; and
5 encoding the electrical signals.

1 18. A charge-coupled device (CCD), comprising:
2 a vertical CCD having a plurality of photosensors arranged in v vertical lines
3 and n horizontal lines corresponding to an $n \times v$ frame of pixels, and converting optical
4 signals to electrical signal image data;
5 a horizontal CCD having n line buffers, each buffer holding up to v pixels of
6 image data;
7 a first switch circuit connected to each of the vertical lines and the line
8 buffers;

1 a first switch control circuit controlling said first switch circuit so that each
2 line buffer sequentially connects to said vertical CCD, the image data in sequential ones of
3 the n horizontal lines of said vertical CCD being transferred to a corresponding one of the n
4 line buffers;

5 a second switch circuit connected to the line buffers and an external circuit;
6 and

7 a second switch control circuit controlling said second switch circuit so that
8 each line buffer sequentially connects to the external circuit, the image data in the line
9 buffers being transferred to the external circuit in blocks of $n \times m$ ($m < v$) pixels, each line
10 buffer in each block transferring m pixels.

1 19. A charge-coupled device (CCD), comprising:

2 a vertical CCD having a plurality of photosensors arranged in v vertical lines
3 and n horizontal lines corresponding to an $n \times v$ frame of pixels, each horizontal line being
4 divided into k line sections, each line section corresponding to m ($m < k$) pixels of image
5 data, and converting optical signals to electrical signal image data;

6 a horizontal CCD having k line buffers connected to an external circuit, each
7 line buffer holding up to m pixels of image data;

8 a switch circuit connected to the line buffers and the external circuit;

9 a transfer control circuit controlling said vertical CCD such that blocks of $n \times$
10 m pixels of image data are transferred from said vertical CCD to the line buffers, wherein a

1 first one of the buffers receives m pixels from a horizontal line and outputs the m pixels to
2 the external circuit before receiving another m pixels from the next horizontal line and so
3 forth until a first block of $n \times m$ pixels has been transferred and output, and repeating the
4 transfer and output operations for each remaining line buffer and the remaining image data;
5 and

6 a switch control circuit controlling said switch circuit so that each line buffer
7 sequentially connects to the external circuit to output the image data to the external circuit.

1 20. A charge-coupled device (CCD), comprising:

2 a vertical CCD having a plurality of photosensors arranged in v vertical lines
3 and n horizontal lines corresponding to an $n \times v$ frame of pixels, and converting optical
4 signals to electrical signal image data;

5 a horizontal CCD having n line buffers, each buffer holding up to v pixels of
6 image data;

7 a switch circuit connected to each of the vertical lines and the line buffers;
8 and

9 a switch control circuit controlling said switch circuit so that each line buffer
10 sequentially connects to said vertical CCD, the image data in sequential ones of the n
11 horizontal lines of said vertical CCD being transferred to a corresponding one of the n line
12 buffers, and the image data in the n line buffers being output in parallel to the external
13 circuit.

1 21. A charge-coupled device (CCD), comprising:

2 an array of photosensors arranged in v vertical lines and n horizontal lines
3 corresponding to an $n \times v$ pixel array of image data; and
4 a plurality of n line buffers, each line buffer holding up to v pixels of image
5 data,

6 wherein each line buffer sequentially connecting to said array, the image data
7 in sequential ones of the n horizontal lines of said array being transferred to a corresponding
8 one of the n line buffers, and each line buffer sequentially outputting the image data, the
9 image data in the line buffers being output in blocks of $n \times m$ ($m < v$) pixels, each line
10 buffer in each block outputting m pixels.

1 22. A charge-coupled device (CCD), comprising:

2 an array of photosensors arranged in v vertical lines and horizontal lines
3 corresponding to an $n \times v$ pixel array of image data, each horizontal line being divided into k
4 line sections, each line section corresponding to m ($m < k$) pixels of image data; and

5 a plurality of k line buffers, each line buffer holding up to m pixels of image
6 data,

7 wherein blocks of $n \times m$ pixels of image data are transferred from the array of
8 photosensors to the line buffers, such that a first one of the buffers receives m pixels from a
9 horizontal line and outputs the m pixels before receiving another m pixels from the next

1 horizontal line and so forth until a first block of $n \times m$ pixels has been transferred and
2 output, and repeating the transfer and output operations for each remaining line buffer and
3 the remaining image data.

1 23. A charge-coupled device (CCD), comprising:

2 an array of photosensors arranged in v vertical lines and n horizontal lines
3 corresponding to an $n \times v$ pixel array of image data; and

4 a plurality of n line buffers, each line buffer holding up to v pixels of image
5 data,

6 wherein each line buffer sequentially connecting to said array, the image data
7 in sequential ones of the n horizontal lines of said array being transferred to a corresponding
8 one of the n line buffers, the image data in the n line buffers being output in parallel.

1 24. A method of outputting image data from a charge-coupled device (CCD),
2 comprising:

3 arranging a plurality of photosensors in v vertical lines and n horizontal lines
4 corresponding to an $n \times v$ pixel array of image data;

5 connecting, sequentially, each one of a plurality of n line buffers to the array
6 of photo sensors, each line buffer holding up to v pixels of image data, and transferring the
7 image data in sequential ones of the n horizontal lines of the array to a corresponding one of
8 the n line buffers; and

1 outputting, sequentially, the image data of each line buffer, the image data in
2 the line buffers being output in blocks of $n \times m$ ($m < v$) pixels, each line buffer in each
3 block outputting m pixels.

4
5 25. A method of outputting image data from a charge-coupled device (CCD),
6 comprising:

7 arranging a plurality of photosensors in v vertical lines and n horizontal lines
8 corresponding to an $n \times v$ pixel array of image data;

9 dividing each horizontal line into k line sections, each line section
10 corresponding to m ($m < k$) pixels of image data;

11 transferring blocks of $n \times m$ pixels of image data from the array of
12 photosensors to a plurality of k line buffers, each line buffer holding up to m pixels of image
13 data, such that a first one of the buffers receives m pixels from a horizontal line and outputs
14 the m pixels before receiving another m pixels from the next horizontal line and so forth
15 until a first block of $n \times m$ pixels has been transferred and output, and repeating the transfer
16 and output operations for each remaining line buffer and the remaining image data.

1 26. A method of outputting image data from a charge-coupled device (CCD),
2 comprising:

3 arranging a plurality of photosensors in v vertical lines and n horizontal lines
4 corresponding to an $n \times v$ pixel array of image data; and

1 connecting, sequentially, each one of a plurality of n line buffers to the array
2 of photo sensors, each line buffer holding up to v pixels of image data, and transferring the
3 image data in sequential ones of the n horizontal lines of the array to a corresponding one of
4 the n line buffers, and outputting the image data in the n line buffers in parallel.